Log: Week 1

2020-09-30T11:42:50+01:00

This week, I have been primarily concerned with researching possible project topics.

I had originally thought I would like to do research into nature inspired optimisation techniques and their potential applications in the world of fully autonomous road networks. Whilst this is still an area I am interested in, and would like to research, it has been suggested to me that it might be beneficial for me to choose a topic more closely related to my supervisor's field of study.

Possible Topics

Swarm Road Networks

This was my initial idea, I had thought I would look into and develop proof (or dis-proof) of concept algorithms which would attempt to plan routes in real time for a network (or swarm) of autonomous, inter-connected agents (modelling vehicles)

Incorporating Quantum Computing research

- Quantum Applications on route finding and planning, may allow to loop back in with Autonomous road network planning.
  - VW research
  - The area of Quantum Genetic Algorithms for path finding seems active. I have found a paper by Tian, Y et al. dated from 2019 on quantum route selection using a[n] (I)QGA
- According to this paper, in a "RQGA, we can consider the population is made up of a single chromosome in a state of superposition" meaning the optimal solution (given enough qubits) is found in a single generation. This could have good applications within real-time systems such as self-driving cars.

Plan for Next Week

My intention for next week is to continue to read around the subjects listed above, I have already collated ~5 papers related to GAs and QGAs.

I would also like to look into the current research & implementations of QGAs in programming languages, including the use of the Qiskit package for python.